

Heredity

*Developed as part of Complementary Learning: Arts-integrated Math and Science
Curricula generously funded by the Martha Holden Jennings Foundation*

Unit – Science – Life Science - Heredity

Grade Level and Subject Area

Grade: 2

Introduce Heredity in animals

Key Concepts:

Compare similarities and differences that exist among individuals of the same kind of plants and animals (including people).

Materials

- Activeboard
- Images of cells and DNA
- Marshmallows and toothpicks
- Homework sheet
- CMA Pictures Powerpoint
- Additional resources
 - Images (cells and DNA molecules)
 - Book – The Little Penguin by A.J. Wood
 - Book – Baby Animals – Worldbook (Childcraft)
 - Book – The Animals of Buttercup Farm by Phoebe and Judy Dunn
 - Video – The Magic School Bus Goes Cellular

Lesson Plan

Day 1

1. Read the story “The Little Penguin” by A. J. Wood
2. Discuss what „Heredity” means
3. Show pictures of cells (found on Google images) and discuss what cells are
4. Show pictures of a DNA molecule (found on Google images) and discuss what DNA is
5. Make a DNA molecule using small colored marshmallows and a toothpick
6. Assign homework sheet to be completed by the next class

Day 2:

1. Read the story “Baby Animals” Worldbook – Childcraft
2. Make a class pictograph on the ActivBoard of students hair color.
3. Make a class tally chart on the Activboard of students eye color.
4. Make a class bar graph on the Activboard of students dominant hand
5. Observe and discuss CMA pictures of baby animals and their parents
(All graphs can be done on the blackboard also!)

Day 3:

1. Read the story “The Animals of Buttercup Farm” by Phoebe and Judy Dunn
2. Students will watch Magic School Bus Goes Cellular as Teacher calls students up individually to complete Activity Rubric

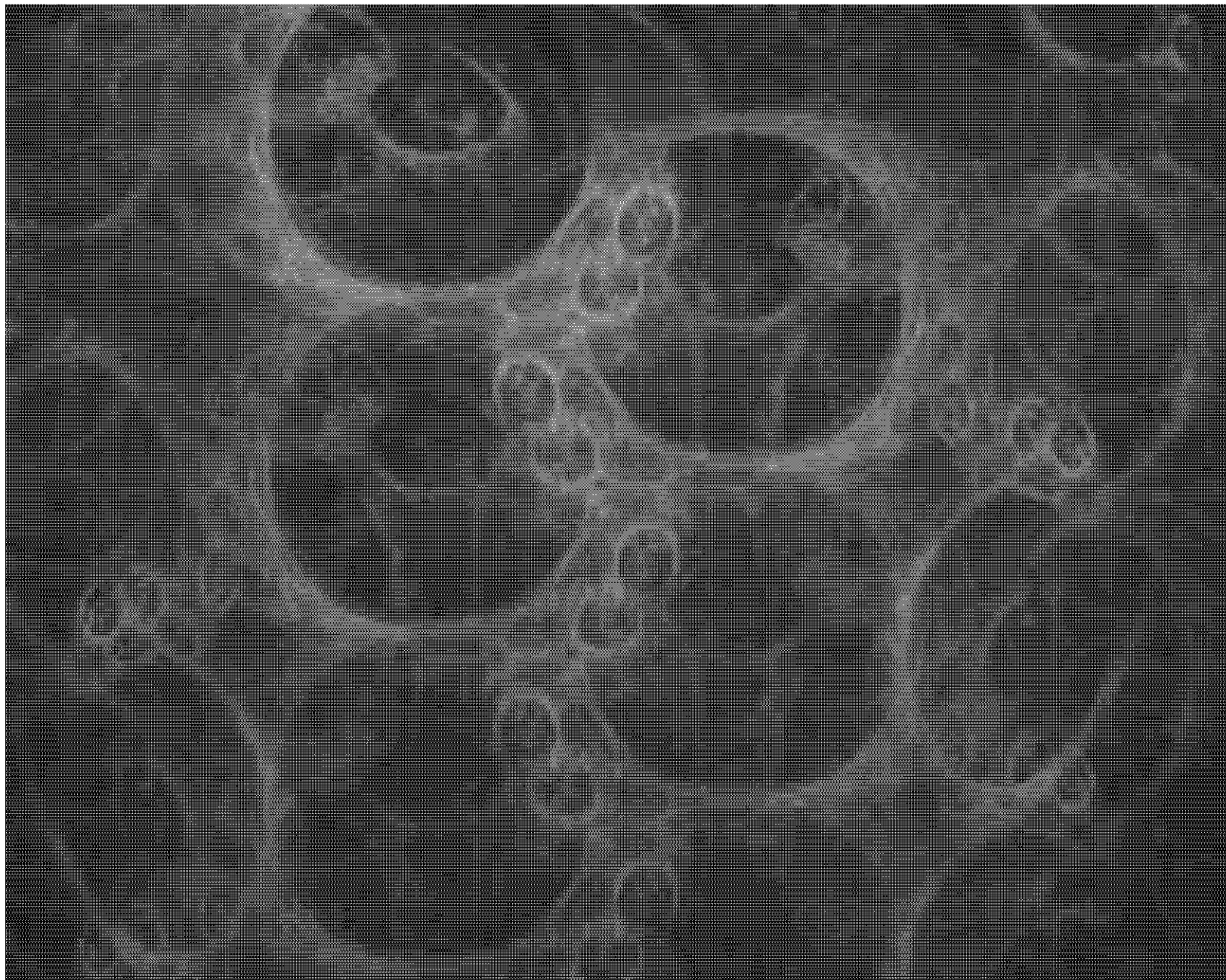
Assessment

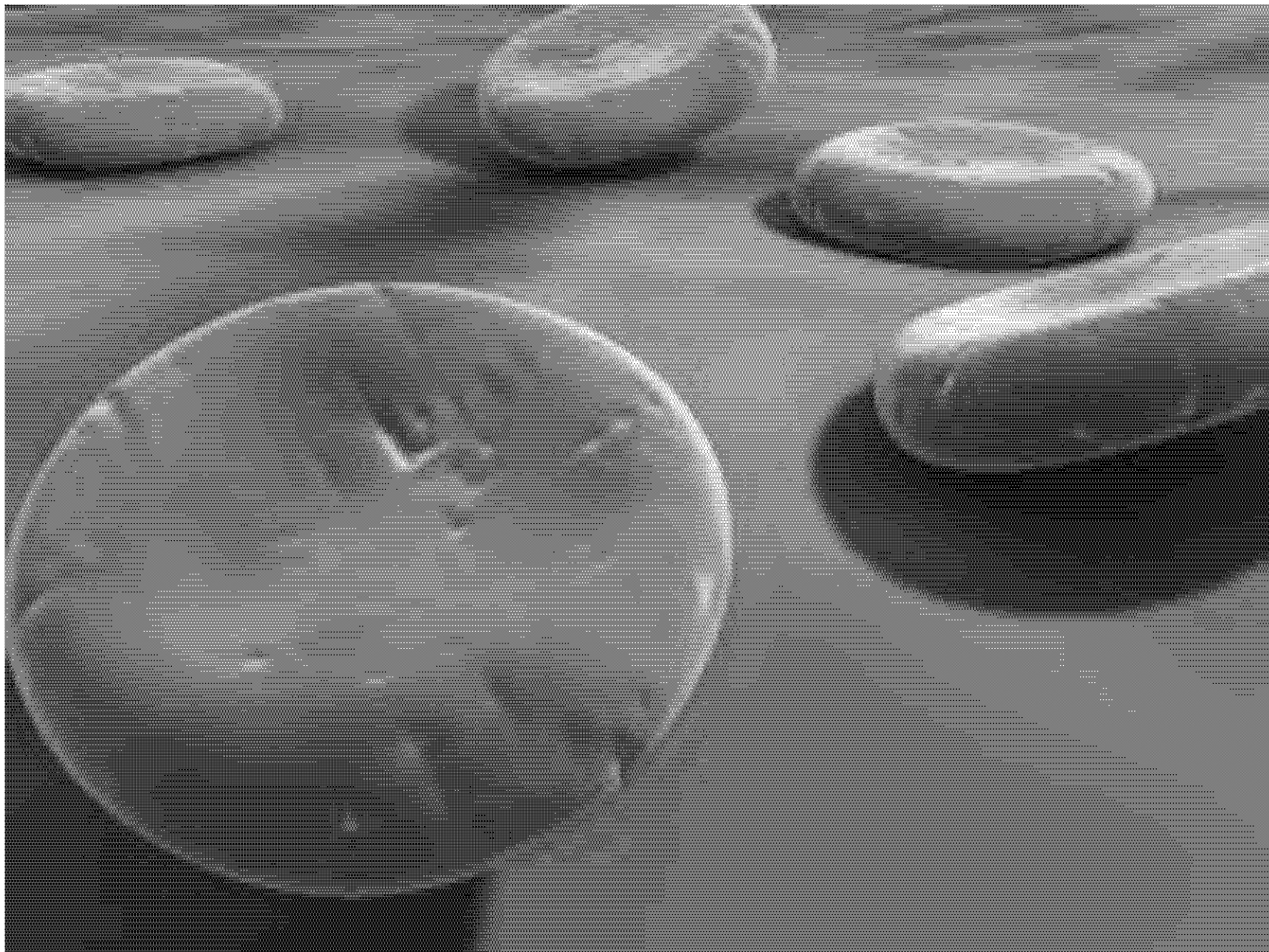
Science - Activity Rubric

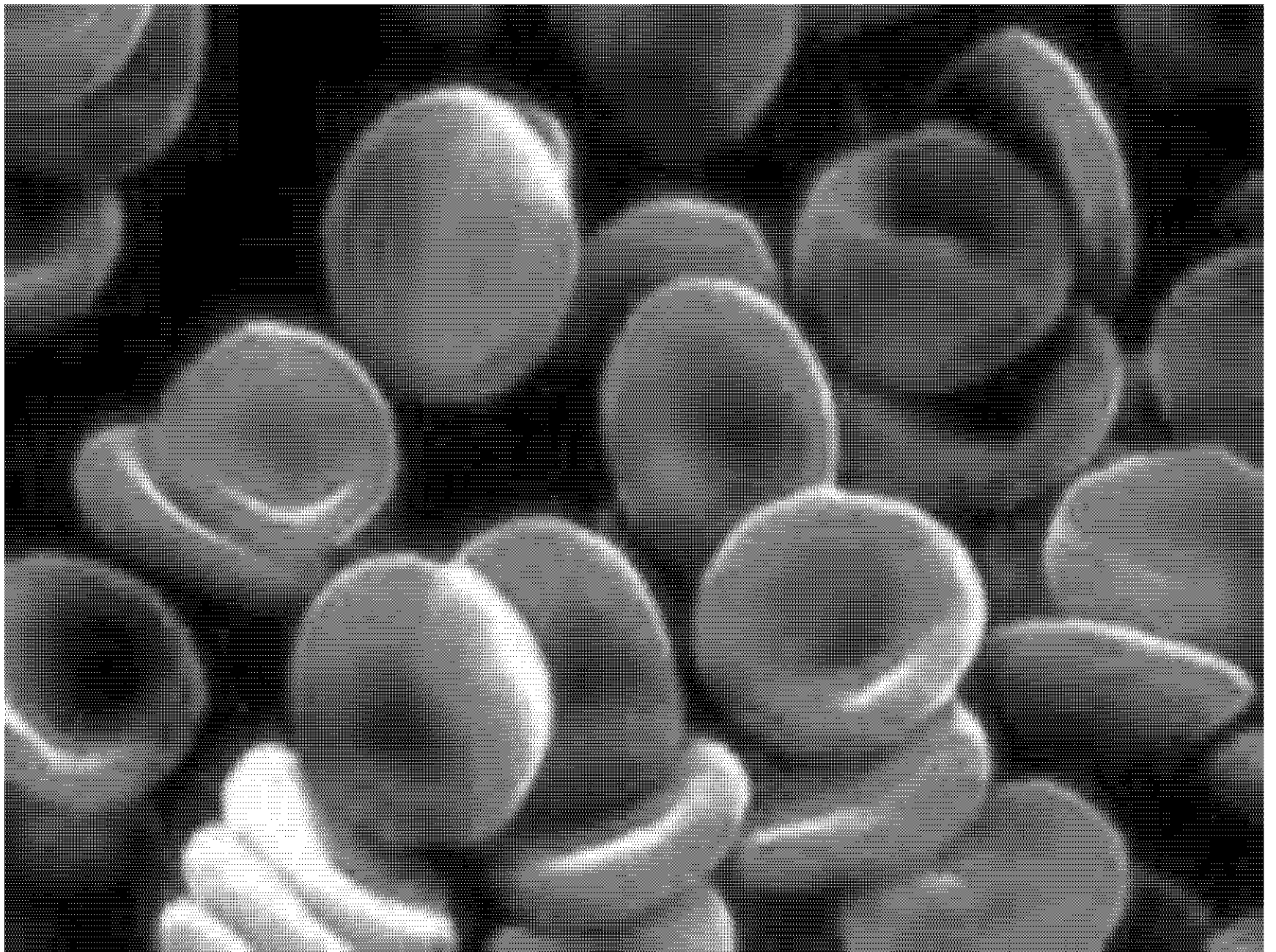
Teaching Standards

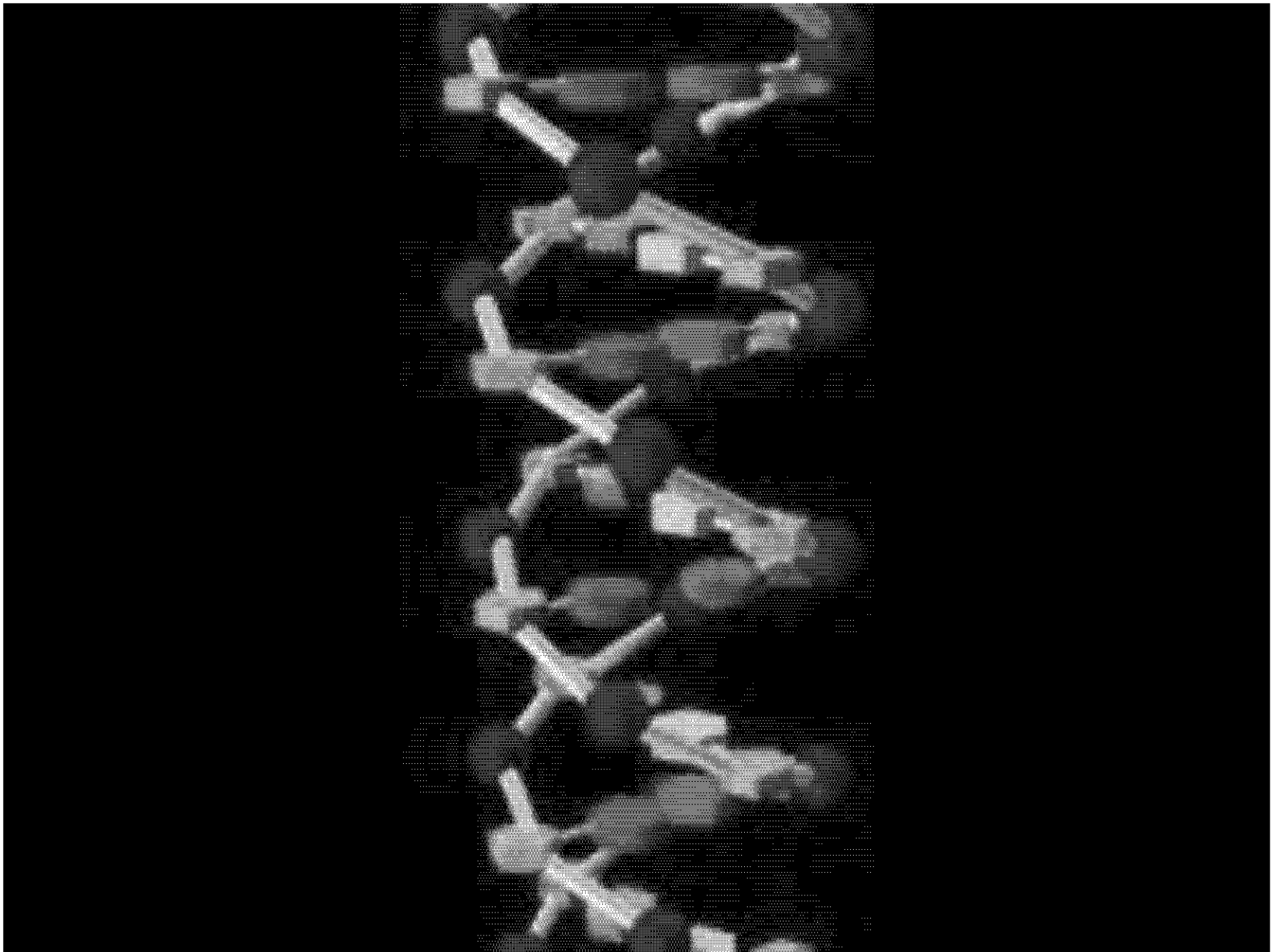
Life Sciences

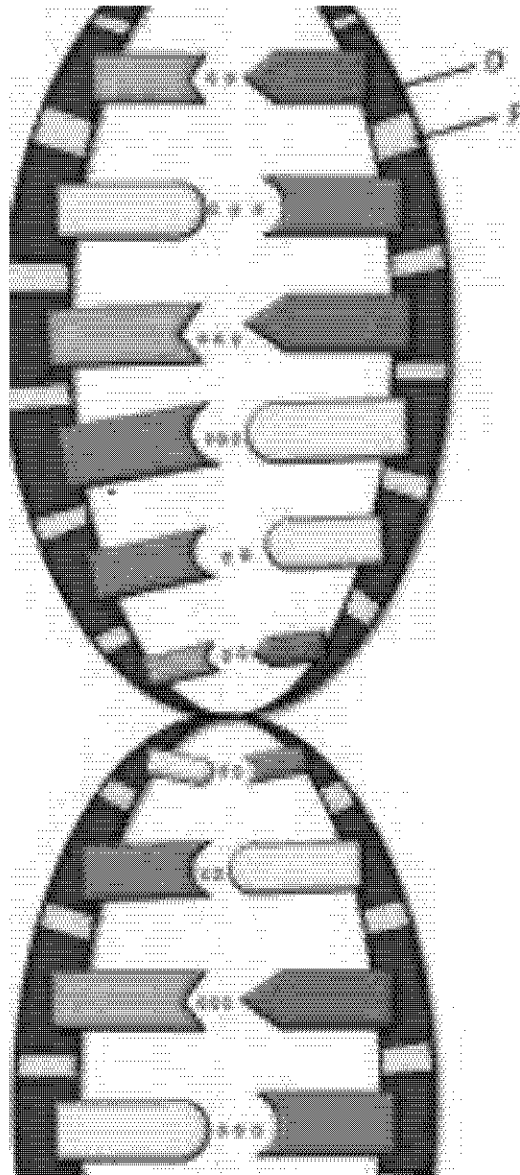
Cell and DNA Images











Thymine

Adenine

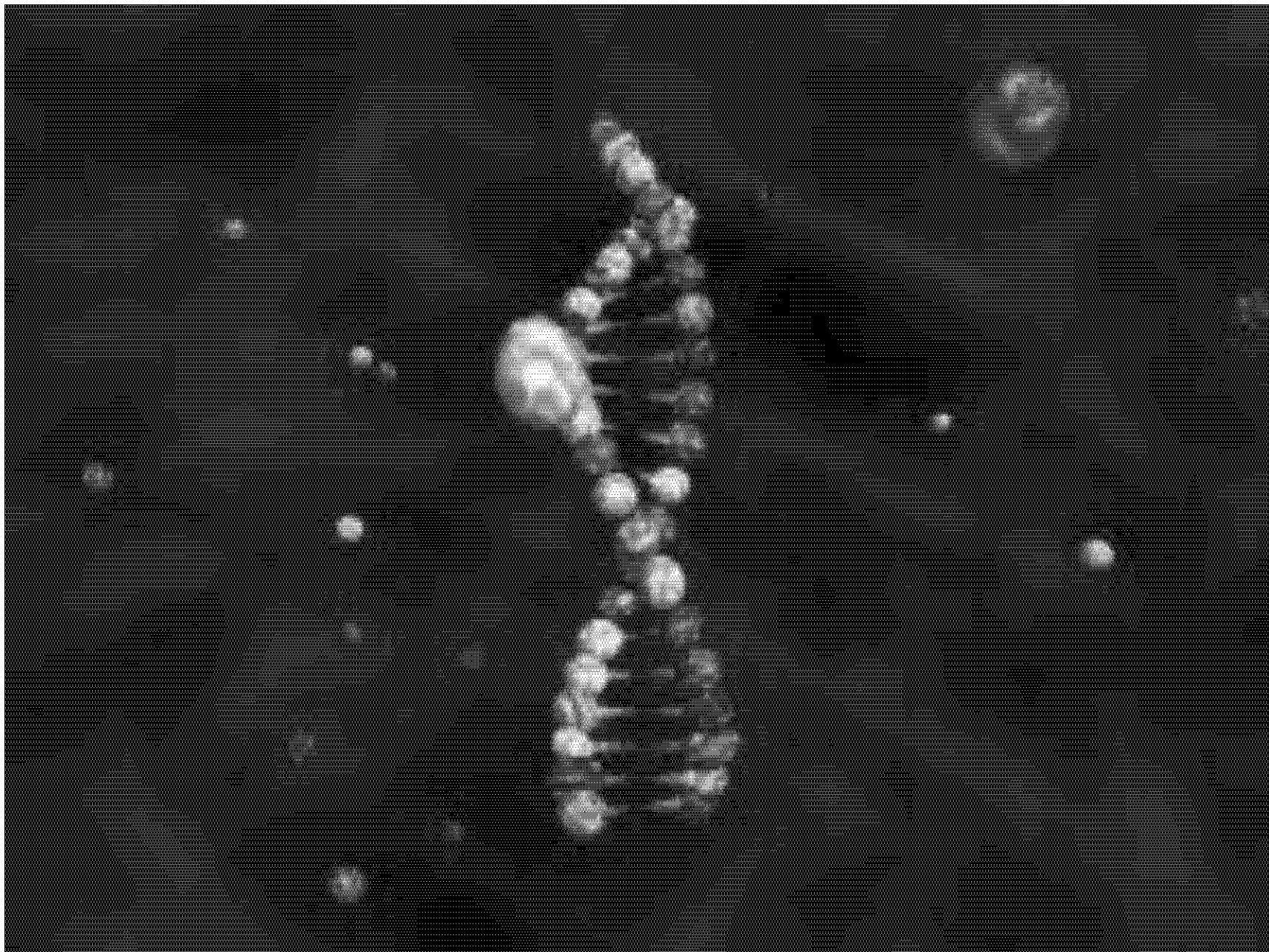
Guanine

Cytosine

D = Deoxyribose
(sugar)

P = Phosphate

*** Hydrogen
Bond



Science Worksheet

Life Science - Heredity

1. My Mom's eye color is _____ .

2. My Dad's eye color is _____ .

3. My eye color is _____ .

4. My Mom's hair color is _____ .

5. My Dad's hair color is _____ .

6. My hair color is _____ .

7. My Mom writes with her _____ hand.

8. My Dad writes with his _____ hand.

9. I write with my _____ hand.



Hair Color Pictograph

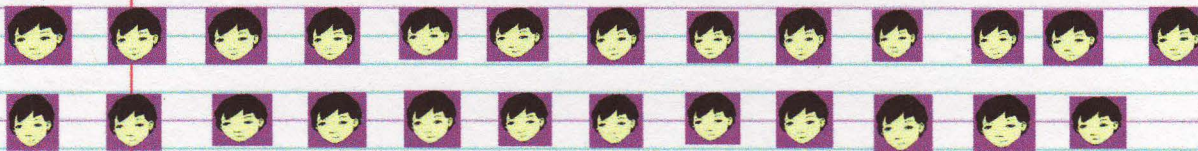
Mom's Hair Color

Dad's Hair Color

Both Parents
Hair Color

Neither Parent
Hair Color

1 2 3 4 5 6 7 8 9 10 11 12 13



Students will each move a head for their hair color.
(Blackboard students will draw a smile face for their hair color.)

Eye Color Tally Chart

Total

Mom's Eye Color

Dad's Eye Color

Neither Parent Eye Color

Both Parents Eye Color

Students will each make a tally mark for their eye color.

Dominant Hand Bar Graph

Dominant Hand
Like Mom

Dominant Hand
Like Dad

Dominant Hand
Like Both Parents

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Students will each color a box for their dominant hand.

1916.1030detFR.tif



Metadata

Accession Number:	1916.1030
Primary Title:	Street Singer and Child
Date:	18th century
Artist(s):	John Opie (British, 1761-1807)
Credit Line:	Gift of Mr. and Mrs. J. H. Wade
Department:	European Painting and Sculpture
Collection:	P - British before 1800
Artists search link:	John Opie
Classification:	Painting
Medium:	oil on canvas
Copyright:	
Dimensions:	Unframed - h:76.50 w:64.30 cm (h:30 1/16 w:25 5/16 inches)
Filename:	1916.1030detFR.tif
Label Copy:	
Object ID:	3377
Object Type:	A
Period:	18th century
Inscription	Inscribed across book: "LOVE/CLOWN (N or R).
Inscription	
Label Copy:	



Metadata

Accession Number:	1921.320
Primary Title:	Woman and Child Beside a Mirror Stand
Date:	c. 1740s
Artist(s):	Nishikawa Sukenobu (Japanese, 1671-1754)
Credit Line:	Gift from J. H. Wade
Department:	Japanese Art
Collection:	Japanese Art
Artists search link:	Nishikawa Sukenobu
Classification:	Print
Medium:	color woodblock print
Copyright:	
Dimensions:	Sheet - h:25.60 w:37.40 cm (h:10 1/16 w:14 11/16 inches)
Filename:	1921.320.tif
Label Copy:	
Object ID:	41420
Object Type:	A
Period:	Edo Period (1615-1868)
Inscription	
Inscription	

1927.393.tif



Metadata

Accession Number:	1927.393
Primary Title:	Elizabeth Shewell West and Her Son, Raphael
Date:	c. 1770
Artist(s):	Benjamin West (American, 1738-1820)
Credit Line:	The Charles W. Harkness Gift
Department:	American Painting and Sculpture
Collection:	American - Painting
Artists search link:	Benjamin West
Classification:	Painting
Medium:	oil on canvas
Copyright:	
Dimensions:	Framed - h:88.00 w:87.50 d:9.00 cm (h:34 5/8 w:34 7/16 d:3 1/2 inches) Unframed - h:66.50 w:66.30 cm (h:26 1/8 w:26 1/16 inches)
Filename:	1927.393.tif
Label Copy:	West was the first American artist to study in Italy, where he spent three years before permanently settling in London. He so admired the artistic ideals of the Italian Renaissance master Raphael that he named his eldest son after him, and he imitated Raphael's celebrated Madonna of the Chair when composing this tender double portrait of his wife and child.
Object ID:	3511
Object Type:	A

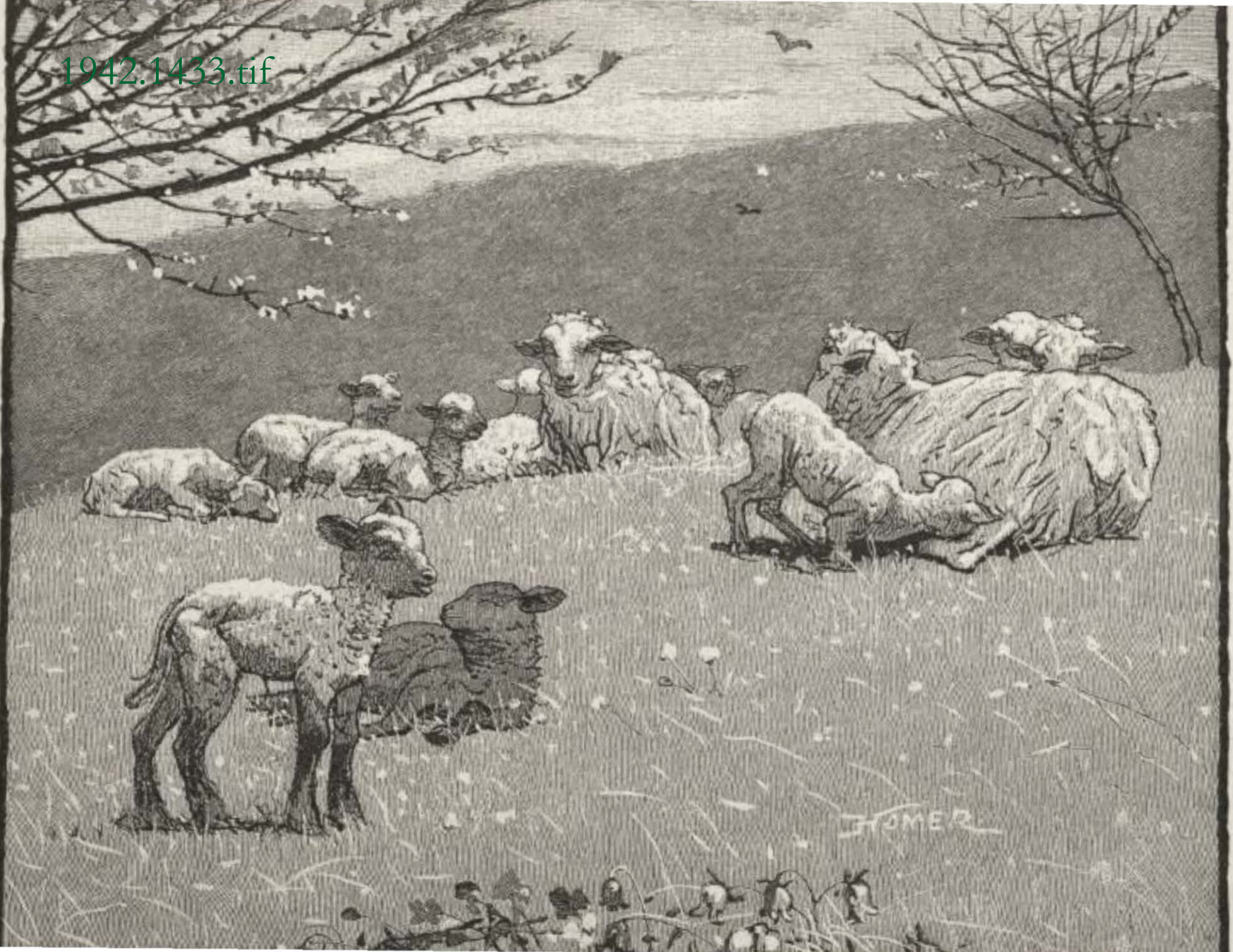
1942.1011.tif



Metadata

Accession Number:	1942.1011
Primary Title:	Mother and Child Standing
Date:	1908
Artist(s):	Ethel Leontine Gabain (British, 1883-1958)
Credit Line:	Mr. and Mrs. Lewis B. Williams Collection
Department:	Prints
Collection:	PR - Lithograph
Artists search link:	Ethel Leontine Gabain
Classification:	Print
Medium:	lithograph
Copyright:	
Dimensions:	
Filename:	1942.1011.tif
Label Copy:	
Object ID:	24195
Object Type:	A
Period:	20th century
Inscription	
Inscription	

1942.1433.tif



JOMER

Metadata

Accession Number:	1942.1433
Primary Title:	Spring Lamb
Date:	1880
Artist(s):	Winslow Homer (American, 1836-1910)
Credit Line:	Purchase from the J. H. Wade Fund
Department:	Prints
Collection:	PR - Wood engraving
Artists search link:	Winslow Homer
Classification:	Print
Medium:	wood engraving
Copyright:	
Dimensions:	
Filename:	1942.1433.tif
Label Copy:	
Object ID:	36166
Object Type:	A
Period:	19th century
Inscription	
Inscription	

1947.53.tif



Metadata

Accession Number:	1947.53
Primary Title:	Kittens at Play
Date:	1947
Artist(s):	manufacturer Onondaga Silk Company (American), designer Waldo Pierce (American, 1884-1970)
Credit Line:	Educational Purchase Fund
Department:	Textiles
Collection:	Textiles
Artists search link:	Waldo Pierce
Artists search link:	Onondaga Silk Company
Classification:	Textile
Medium:	plain weave silk, printed
Copyright:	
Dimensions:	Overall - h:67.94 w:100.33 cm (h:26 11/16 w:39 1/2 inches)
Label Copy:	
Object ID:	50616
Object Type:	A
Period:	20th century
Inscription	
Inscription	

1965.469detFR.tif



Metadata

Accession Number:	1965.469
Primary Title:	Laban Searching for his Stolen Household Gods
Date:	c. 1665-1670
Artist(s):	Bartolomé Esteban Murillo (Spanish, 1617-1682)
Credit Line:	Gift of the John Huntington Art and Polytechnic Trust
Department:	European Painting and Sculpture
Collection:	P - Spanish before 1800
Artists search link:	Bartolomé Esteban Murillo
Classification:	Painting
Medium:	oil on canvas
Copyright:	
Dimensions:	Framed - h:278.00 w:398.00 d:14.00 cm (h:109 7/16 w:156 11/16 d:5 1/2 inches) Unframed - h:243.00 w:362.00 cm (h:95 5/8 w:142 1/2 inches)
Filename:	1965.469detFR.tif
Label Copy:	This story comes from the Old Testament book of Genesis and stresses the value of reconciliation. Jacob lived with his uncle Laban for years, marrying Laban's daughters Rachel and Leah. When the relationship between the men soured, Jacob and his family departed, while Rachel secretly stole her father's household gods. When Laban discovered that the statues were missing, he pursued Jacob, accusing him of theft. Here, Jacob invites Laban to search his tent, while Rachel sits on the saddlebag containing the statues. After coming up empty-

1970.71.2.jpg



Metadata

Accession Number:	1970.71.2
Primary Title:	Puppies, Sparrows and Chrysanthemums
Date:	1754-1799
Artist(s):	Nagasawa Rosetsu (Japanese, 1754-1799)
Credit Line:	John L. Severance Fund
Department:	Japanese Art
Collection:	ASIAN - Hanging scroll
Artists search link:	Nagasawa Rosetsu
Classification:	Painting
Medium:	fusuma panel mounted as a hanging scroll; ink and slight color on paper
Copyright:	
Dimensions:	Overall - h:211.40 w:94.00 cm (h:83 3/16 w:37 inches) Painted surface - h:167.60 w:91.50 cm (h:65 15/16 w:36 inches)
Filename:	1970.71.2.jpg
Label Copy:	Rosetsu is regarded as one of the most versatile painters of 18th-century Japan. He studied in Kyoto, Japan's cultural capital, and enjoyed a successful career as an independent artist rather than as a more conservative "school" artist. Originally, these four paintings were mounted on the wall panels (fusuma) used to define room spaces in traditional Japanese interior settings. The light wood panels slide along grooves, allowing interior spaces to change with minimal effort. The round

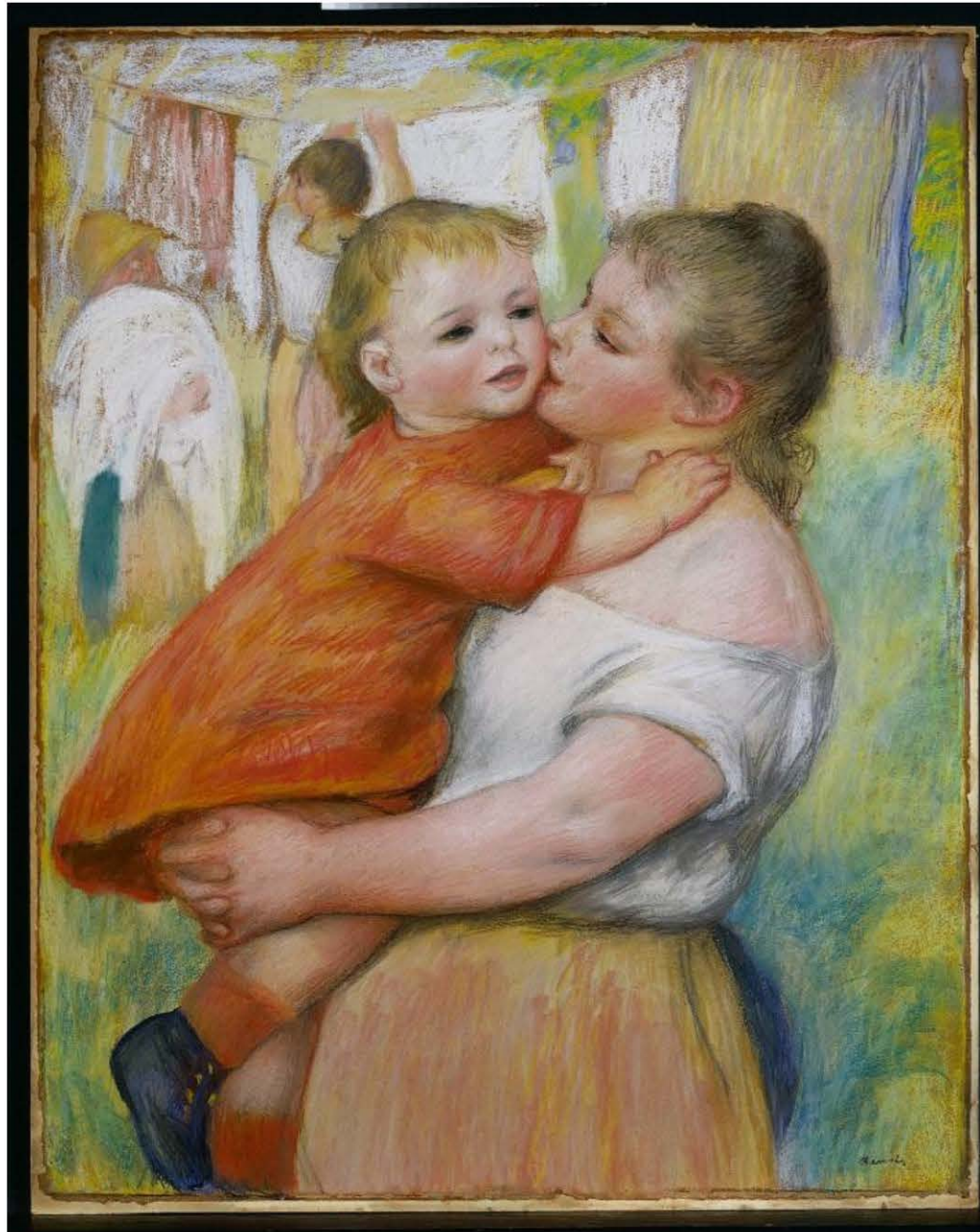
1977.120.tif



Metadata

Accession Number:	1977.120
Primary Title:	Madeleine Lerolle and Her Daughter Yvonne
Date:	c. 1879-1880
Artist(s):	Albert Besnard (French, 1849-1934)
Credit Line:	Gift of Mr. and Mrs. Noah L. Butkin
Department:	Modern European Painting and Sculpture
Collection:	Mod Euro - Painting 1800-1960
Artists search link:	Albert Besnard
Classification:	Painting
Medium:	oil on fabric
Copyright:	
Dimensions:	Framed - h:191.45 w:142.24 d:9.53 cm (h:75 5/16 w:56 d:3 3/4 inches) Unframed - h:165.00 w:115.50 cm (h:64 15/16 w:45 7/16 inches)
Filename:	1977.120.tif
Label Copy:	This double portrait, exhibited at the Paris Salon of 1883, depicts the wife and daughter of Besnard's friend and fellow artist Henri Lerolle. Besnard emphasized their close relationship by placing Madeleine Lerolle and her daughter Yvonne in the familiar setting of the artist's studio, reflecting the artist's stated ambition of portraying figures in the natural setting of the world in which they live. Gift of Mr. and Mrs. Noah L. Butkin, 1977.120

1977.167.tif



Metadata

Accession Number:	1977.167
Primary Title:	Mother and Child
Date:	1886
Artist(s):	Pierre Auguste Renoir (French, 1841-1919)
Credit Line:	Bequest of Alexander Ginn
Department:	Drawings
Collection:	DR - French
Artists search link:	Pierre Auguste Renoir
Classification:	Drawing
Medium:	pastel
Copyright:	
Dimensions:	Sheet - h:79.10 w:63.50 cm (h:31 1/8 w:25 inches) Framed - h:99.00 w:82.50 d:4.20 cm (h:38 15/16 w:32 7/16 d:1 5/8 inches)
Filename:	1977.167.tif
Label Copy:	Renoir often used the people that were close to him as the models in his works. The woman seen here may be his future wife Aline Charigot (the couple married in 1890, after a decade-long acquaintance) shown kissing their son Pierre. If this assumption is correct, then Renoir executed the work some two or three years after 1885, the year Pierre was born. There exists another version of this composition, executed in oil on canvas, presently at the Barnes Foundation in Merion, Pennsylvania.

1984.58det03.tif



Metadata

Accession Number:	1984.58.a
Primary Title:	Hen and Chicks Tureen
Date:	c. 1755
Artist(s):	Chelsea Porcelain Factory (British)
Credit Line:	Purchase from the J. H. Wade Fund
Department:	Decorative Art and Design
Collection:	Decorative Arts
Artists search link:	Chelsea Porcelain Factory
Classification:	Ceramic
Medium:	porcelain
Copyright:	
Dimensions:	Overall - h:24.80 w:34.90 d:25.70 cm (h:9 3/4 w:13 11/16 d:10 1/16 inches)
Filename:	1984.58det03.tif
Label Copy:	The Chelsea porcelain factory, in what is now London, was England's most important ceramic manufactory in the mid-18th century. Large tureens in the form of chickens or rabbits have long been recognized as outstanding products of this factory. The condition of Cleveland's amusing hen with her chicks is particularly good. The tureen was recently united with a stand of the same design as one originally intended to accompany it.
Object ID:	5267
Object Type:	A



Metadata

Accession Number:	1985.349
Primary Title:	Woman and Child with Goldfish Bowl
Date:	c. mid 1720s
Artist(s):	Nishimura Shigenaga (Japanese, 1697(?)-1756)
Credit Line:	The Kelvin Smith Collection, given by Mrs. Kelvin Smith
Department:	Japanese Art
Collection:	Japanese Art
Artists search link:	Nishimura Shigenaga
Classification:	Print
Medium:	hand-colored woodblock print
Copyright:	
Dimensions:	Sheet - h:33.70 w:15.90 cm (h:13 1/4 w:6 1/4 inches)
Filename:	1985.349.tif
Label Copy:	This early hand-colored print is enriched with a technique called urushi-e (literally "lacquer picture"), in which deer glue is painted over areas of black pigment, producing a lustrous effect reminiscent of lacquer. Metal filings were sometimes sprinkled onto the pigment for further effect. Known for prints with a wide variety of subjects, including landscapes, actors, and classical literature, Shigenaga specialized in female figures. He was influenced by Masanobu and Kiyonobu, both also in this exhibition.

1985.362.tif



Metadata

Accession Number:	1985.362
Primary Title:	Rooster, Hen, and Chicks
Date:	c. 1880s
Artist(s):	Shibata Zeshin (Japanese, 1807-1891)
Credit Line:	The Kelvin Smith Collection, given by Mrs. Kelvin Smith
Department:	Japanese Art
Collection:	Japanese Art
Artists search link:	Shibata Zeshin
Classification:	Print
Medium:	color woodblock print
Copyright:	
Dimensions:	Overall - h:28.90 w:43.20 cm (h:11 3/8 w:17 inches)
Filename:	1985.362.tif
Label Copy:	
Object ID:	31877
Object Type:	A
Period:	Edo Period (1615-1868)
Inscription	Artist Seal: Shin
Inscription	
Label Copy:	

1987.65.tif



Metadata

Accession Number:	1987.65
Primary Title:	Tigress and Cubs
Date:	300s
Artist(s):	Italy, Roman, Eastern Roman Empire, 4th century
Credit Line:	John L. Severance Fund
Department:	Greek and Roman Art
Collection:	GR - Roman
Artists search link:	
Classification:	Mosaic
Medium:	tesserae
Copyright:	
Dimensions:	Overall - h:142.90 w:135.40 cm (h:56 1/4 w:53 1/4 inches)
Filename:	1987.65.tif
Label Copy:	
Object ID:	38061
Object Type:	A
Period:	4th century
Inscription	
Inscription	

1995.203.33.15.tif



HOPÍ MOTHER AND CHILD

Metadata

Accession Number:	1995.203.33.15
Primary Title:	The North American Indian: being a series of Portfolios picturing and describing the Indians of the United States, the Dominion of Canada, and Alaska, Portfolio XIII, Plate 450: Hupa Mother and Child
Date:	1923
Artist(s):	Edward S. Curtis (American, 1868-1952)
Credit Line:	Presented by Mrs. James H. Hoyt, Elton Hoyt, II, and Mrs. Amasa Stone Mather in memory of James H.
Department:	Photography
Collection:	PH - Photogravure
Artists search link:	Edward S. Curtis
Classification:	Portfolio
Medium:	photogravure
Copyright:	
Dimensions:	
Filename:	1995.203.33.15.tif
Label Copy:	
Object ID:	33178
Object Type:	A
Period:	20th century

1995.203.38.17.tif



Arsinigoin, Northwest Coast, 1895, by G. H. R. Smith

Arsinigoin, Northwest Coast, 1895, by G. H. R. Smith

Metadata

Accession Number:	1995.203.38.17
Primary Title:	The North American Indian: being a series of Portfolios picturing and describing the Indians of the United States, the Dominion of Canada, and Alaska, Portfolio XVIII, Plate 632: Assiniboin Mother and Child
Date:	1926
Artist(s):	Edward S. Curtis (American, 1868-1952)
Credit Line:	Presented by Mrs. James H. Hoyt, Elton Hoyt, II, and Mrs. Amasa Stone Mather in memory of James H.
Department:	Photography
Collection:	PH - Photogravure
Artists search link:	Edward S. Curtis
Classification:	Portfolio
Medium:	photogravure
Copyright:	
Dimensions:	
Filename:	1995.203.38.17.tif
Label Copy:	
Object ID:	42200
Object Type:	A
Period:	20th century

1995.203.40.7.tif



Metadata

Accession Number:	1995.203.40.7
Primary Title:	The North American Indian: being a series of Portfolios picturing and describing the Indians of the United States, the Dominion of Canada, and Alaska, Portfolio XX, Plate 694: Woman and Child - Nunivak
Date:	1928
Artist(s):	Edward S. Curtis (American, 1868-1952)
Credit Line:	Presented by Mrs. James H. Hoyt, Elton Hoyt, II, and Mrs. Amasa Stone Mather in memory of James H.
Department:	Photography
Collection:	PH - Photogravure
Artists search link:	Edward S. Curtis
Classification:	Portfolio
Medium:	photogravure
Copyright:	
Dimensions:	
Filename:	1995.203.40.7.tif
Label Copy:	
Object ID:	42700
Object Type:	A
Period:	20th century

1997.148.tif



Metadata

Accession Number:	1997.148
Primary Title:	Tiger Family
Date:	late 18th c.
Artist(s):	Korea, Joseon period (Yi Dynasty) (1392-1910)
Credit Line:	Leonard C. Hanna, Jr. Fund
Department:	Korean Art
Collection:	ASIAN - Hanging scroll
Artists search link:	
Classification:	Painting
Medium:	hanging scroll, ink and color on paper
Copyright:	
Dimensions:	Overall - h:262.50 w:106.70 cm (h:103 5/16 w:42 inches)
Filename:	1997.148.tif
Label Copy:	The Korean tiger, now extinct, was venerated for its strength and independence, and as the protector and messenger of San Shin, the Mountain Spirit. The most significant of all Korean folk deities, San Shin is linked mythologically to the founding of the country. Painted images of a single mountain tiger were customarily hung in residences at New Years, to ward off evil spirits. Here a mother tiger frolics with her cubs and---surprisingly---a leopard cub. Korean art frequently presents fresh iconographical, thematic, and stylistic interpretations of

2002.31.tif



Metadata

Accession Number:	2002.31
Primary Title:	Mother and Child
Date:	c. 1855
Artist(s):	Unidentified Photographer ()
Credit Line:	John L. Severance Fund
Department:	Photography
Collection:	PH - American 19th Century
Artists search link:	Unidentified Photographer
Classification:	Photograph
Medium:	daguerreotype, applied color, sixth-plate
Copyright:	
Dimensions:	Image - h:8.30 w:7.00 cm (h:3 1/4 w:2 3/4 inches) Case - h:9.20 w:8.10 d:1.60 cm (h:3 9/16 w:3 3/16 d:5/8 inches) Matted - h:60.98 w:50.80 cm (h:24 w:20 inches)
Filename:	2002.31.tif
Label Copy:	As with other media, some of the most inventive and technically skilled practitioners in the early history of photography are at present unidentified. However, with time more of these individuals will probably be recognized by name. Introduced into America soon after its invention in 1839 by the

2003.293.tif



Metadata

Accession Number:	2003.293
Primary Title:	Mother and Child
Date:	c. 1860
Artist(s):	Unidentified Photographer ()
Credit Line:	Gift of Charles Isaacs and Carol Nigro
Department:	Photography
Collection:	PH - American 19th Century
Artists search link:	Unidentified Photographer
Classification:	Photograph
Medium:	ambrotype, tinted, sixth plate
Copyright:	
Dimensions:	Case - h:9.60 w:8.30 cm (h:3 3/4 w:3 1/4 inches) Overall - h:8.30 w:7.00 cm (h:3 1/4 w:2 3/4 inches) Matted - h:60.98 w:48.26 cm (h:24 w:19 inches)
Filename:	2003.293.tif
Label Copy:	
Object ID:	61960
Object Type:	A
Period:	19th century

No Image

Metadata

Accession Number:	1969.77
Primary Title:	Bitch with her Litter
Date:	c. 1780
Artist(s):	India, Rajasthan, Ajmer, probably Sawar school, 18th century
Credit Line:	Gift of Mr. and Mrs. William E. Ward in memory of her father, Charles Svec
Department:	Indian and South East Asian Art
Collection:	Indian Art
Artists search link:	
Classification:	Painting
Medium:	ink and color on paper
Copyright:	
Dimensions:	Image - h:22.00 w:16.50 cm (h:8 5/8 w:6 7/16 inches) Overall - h:18.70 w:25.00 cm (h:7 5/16 w:9 13/16 inches)
Filename:	no name
Label Copy:	
Object ID:	11589
Object Type:	A
Period:	18th century
Accession Number:	